

with white irrorations; face of a peculiar pink-purple color with pink face lines. Body—first segment very white-green, anal segment very yellow-green, the other segments very blue-green, all with white irrorations. The subsorsal lines had disappeared; and the obliques were of small white granules, except the last pair which were pinkish, broader, and rougher. The crests on the second and third segments were much less conspicuous, barely noticeable. Mouth parts, legs, and tips of prolegs pink-purple; a band of deep red-purple on the anal prolegs. Spiracles red purple in pink-purple spots. Anal shield heart-shaped, swelling, with the tip dark red-purple. Caudal horn very short, only 1 mm., slender, white, and rough. On the subsorsal line of ten segments was a spot of red-purple,—in some specimens. Others had but few spots. They varied from three spots, on each side of the body, to ten. These spots recalled the red spots of *S. myops*.

Some specimens sent to Miss Ida M. Eliot in Nonquitt, Mass., and fed on *populus tremuloides*, had no red-purple spots.

Aug. 13th.—The first one stopped eating while the last one hatched was molting for the third time, being much smaller and slower of development than any of the others. Length when full-fed 8 cm.

In the last molt the larvae ate voraciously and were very vigorous. In the first and second molts they were very delicate, and many died without any apparent cause.

These larvae are especially interesting because they omit the plain green, unmarked stage common to most sphingid larvae in the first molt, and because they show, in different stages, marks characteristic of three other species, yet are very different from all of them. I have seen no other sphingid eggs which undergo so many changes of color, or which have any color except green, becoming either yellowish or lead color just before hatching.

Aug. 19.—The first pupa cast the larva skin. The pupa was 4 cm. long, rather stout, with eyes and antennae well defined, and wing-covers short in proportion. Its color was green at first, then brown.

LIFE HISTORIES OF NORTH AMERICAN GEOMETRIDÆ.—I.

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Aplodes mimosaria Guenée. This larva has been briefly described by Walsh and quoted in Packard's works. The description is not only brief, but erroneous, as the larva is entirely without "short velvety hairs" and has none of the structure of *Phobetron*, as is stated by Walsh.

The moths fly early in June, emerging from over-wintering pupae. There is a single annual generation, the six larval stages being slowly passed through, lasting from late June, when the eggs hatch, to September. Observations made on Long Island, N. Y.

Egg. Elliptical, very strongly flattened above and below, the edges sharp, the sides perpendicular, so that the eggs resemble biscuits. One end is depressed, the height being less at one end of the ellipse. Surface strongly reticular, the cell areas appearing almost like granules. Color bright orange, not shining; later red, and just before hatching sordid brown. Size .75 × .6 × .4 mm.

Stage I. Head rounded, smooth, pale brown, slightly streaked with darker; width about .3 mm. Body with a series of triangular subventral projections on joints 5 to 9, bearing setae iv and v which are remote,

normal. Feet normal for Geometridae. Color greenish brown, with faint, narrow dorsal and lateral brown lines, the latter expanding into spots at the projections; venter darkly shaded. Setae both on head and body short with swollen tips. Later the larva appears rather uniformly dark brown. The projections appear the whole length of the abdomen, but are largest centrally.

Stage II. Roughened; head round, a slight point at apex; width about .4 mm. Tubercles all rather large, especially on the cervical shield and joint 13; setae iv and v of joints 5 to 9 borne on prominent projections. Skin finely spinulose granular. Color yellowish brown, the projections darker, reddish; tubercles pale; all grizzled by the pale granules. Setae pale, short, pointed.

Stage III. More roughened; subventral processes forked (iv and v), sharp; also smaller lateral points anteriorly and posteriorly; a pair of prominent points on joint 2 and on joint 13 before the triangular anal plate. Head rounded, slightly bilobed; width about .6 mm. Color yellowish brown, densely covered with pale yellow granules, slightly mottled with dark red brown, especially in patches below the processes. Tubercles conic, high; setae short, stiff, white. No well defined markings.

Stage IV. Essentially the same. Head about .8 mm. Lateral projections of joints 5 to 9 flattened, furcate, the anterior limb longest, bearing tubercle v, excavate before, sloping behind; the spiracle borne on the dorsal aspect of the projection; tubercles iv and v conic, pale. Other points on joints 2 to 4 and 12 as before, scarcely any on joints 10 and 11. Color rusty brown dorsally, grayish ventrally, the ventral aspect of the

projections and a series of intersegmental dorsal marks dark brown; narrow, obscure dorsal and subdorsal lines, the latter distinct on joints 10 to 12. Skin densely pale granular.

Stage V. Head bilobed, roughened; width about 1.2 mm. Dead leaf brown, brighter dorsally posteriorly. Three dark brown, triangular marks on joints 5 to 7 anteriorly. Lateral processes obliquely streaked with brown and pale below, especially on joints 5 and 6, furcate as before. Tubercles, high; ii of joint 12 very high; many slightly produced tubercles on the thorax; setae small. Markings faint, but a pale dorsal line and a subdorsal and medio-ventral can be traced. Skin rough as before.

Stage VI. Head bilobed, the lobes slightly pointed, roughened granular, rusty brown; width 1.6 mm. Body granular, the tubercles prominent, single, normal. Lateral processes on joints 5 and 9 small, those of 6 to 8 large, furcate, bearing tubercles iv and v; four cones on the cervical shield; a subdorsal elevation with three cones on joints 3 and 4; a slight subventral prominence on joints 10 to 12; tubercles ii on joint 12 form long cones. All roughened granular; color dead leaf brown, a little variegated, being slightly grayish dorsally on joints 6 to 8 faintly brown lined longitudinally and with dark brown dots on joints 6 to 9 anteriorly and a bent white lateral line on joints 10 to 12. Spiracles dark ringed. The appearance is as in the previous stages. This stage lasted 30 days.

Food plant. Oak. The larvae are sluggish, solitary, and rest on the brown leaf where they have fed, their ragged appearance harmonizing with the mutilated and partly withered leaf.

SOME SYNONYMY.

APIIDAE.

(1.) *Melanostelis rubi* (Ckll.) = *Stelis rubi*, Ckll., Entom., July 1898, p. 167. n. syn. *Mel-*

anostelis betheli Ashm., Psyche, Nov. 1898, p. 283.

COCCIDAE.

(2.) *Pulvinaria pyriformis* Ckll., Jn.